

A SEMIOTIC ANALYSIS OF BIOTECHNOLOGY AND FOOD SAFETY
PHOTOGRAPHS

A Thesis

by

JENNIFER LYNN NORWOOD

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of
MASTER OF SCIENCE

December 2005

Major Subject: Agricultural Education

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ABSTRACT

A Semiotic Analysis of Biotechnology and Food Safety Photographs.

(December 2005)

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This study evaluated photographs used in *Time*, *Newsweek*, and *U.S. News and World Report* in stories about biotechnology and food safety issues from the years 2000 and 2001. This study implemented a semiotic methodology to determine if the messages conveyed by the photographs positively or negatively communicated agricultural issues. This research found that the news magazines had a balanced number of positive and negative photographs. Data indicated that many of the photographs involved similar subjects and, therefore, could be promoting stereotypes. This research also examined the technical methods used by photographers and found that the majority of the photographs were taken with very similar camera settings. This study also found that magazines use a large number of staged shots as opposed to a more documentary style. This staging indicates that photographers have control in the messages communicated to the viewer of the photograph.

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CHAPTER I

INTRODUCTION

The Great Depression is exemplified through Dorothea Lange's photographs of families, migrant workers, and farmers that have become the faces of the Great Depression. The hardships and the struggles of that time are communicated through her photographs. The symbolism of poor lives and loss are created through inclusion of symbols of suffering shown on their faces and through their living conditions.

Daily, photographers capture images to communicate agricultural issues, namely biotechnology and food safety to the American public. Research in agricultural communications has shown that the treatment of agricultural issues by the popular press is lacking and that there is a difference in the sources used by agricultural and popular press magazines.

However, the photographs used to supplement these stories have not been examined in previous research. Daily, images are used to communicate information to the public, ultimately shaping their perceptions of agricultural issues. Understanding how these perceptions are affected by images will ultimately give the agricultural community insight into educating the public about agricultural issues. This study is also intended to give agriculturalists the knowledge they need in order to share an accurate portrayal of agriculturists and agricultural issues. Tagg (1988) wrote that a camera is given power

This thesis follows the style of the Journal of Applied Communications.

through its purpose to record events and when combined with text, images dominate words and are processed in the brain to create perceptions about the subject (Barry, 1997).

Agriculturalists need to understand the power of the visual image and the impact it can have on the perceptions the viewers.

This research will determine how photographs are used by the popular press and agricultural magazines in stories about biotechnology and food safety and will conduct a content analysis, employing semiotics, to determine the types of messages the photographs may suggest about these agricultural topics.

Frick, Birkenholz, Gardener, and Machtmes (1995) found that inner-city high school students from the Midwestern states were significantly less knowledgeable about agriculture than their rural counterparts. Both respondent groups were reported to have a positive perception of agriculture; however, the urban population's perception was based on something other than knowledge of the subject. Trumbo (2000) wrote that there is a great opportunity for research in visual communication in communicating scientific information and he challenged scholars to examine visual literacy within their areas of research. Therefore, it is important to examine for accuracy, the information that is presented to the urban population through the popular press. The urban population, which does not have experiences to compare the messages to, must rely and trust solely, on the information that the media presents. This is important when considering how to educate and develop an agriculturally-literate audience.

Camera settings can be manipulated to produce many different types of photographs of the same subject. The photographer, through settings, manipulate creates

a number of very different images from the same subject and setting. Essentially, the photographer can create a photograph, and can therefore, create a message. These manipulations are the key variables of this study.

These settings can be codes that indicate the message communicated by the photograph. The photographer also controls the message by choosing what the camera will capture and ultimately captures decodable signs.

F. de Saussure (1959) wrote that a person lives in a world shaped by decoded signs found in images, actions, words, and more, which he or she has encountered. His innovation of semiotics is an ancient system used to decode a photograph through examination of the signs within the photograph.

Roland Barthes introduced semiotics to the visual community, and called the message that is created through the signs in the image the making of a “myth,” (Bignell, 2002). Decoding the signs are indications of how the message is communicated to the reader or what myth is being created about a subject.

Signs are classified into three different types. An iconic sign represents what the object is. For example, a photograph of a car would represent the actual vehicle. An indexical sign represents a meaning that is implied through the photographed object. For example, an expensive car would indicate that the owner was wealthy. A symbolic sign is when an image represents another object or idea. The same expensive car could represent luxury or wealth.

This research used a quantitative content analysis as the method to report frequency data. Gall, Gall, and Borg (2003) identified content analysis as an effective

research technique for researching the messages encoded in various forms of media, including visual media, specifically photographs.

Statement of the Problem

This study evaluated the difference in the quantity and nature of photographs used in biotechnology and food safety images in the popular press magazines: *Time*, *Newsweek*, and *U.S. News & World*.

This study will be guided by the following objectives.

1. Determine the types of message categories conveyed through the photographs used in biotechnology and food safety stories in *Time*, *Newsweek*, and *U.S. News & World Report*.
2. Compare the messages conveyed through photographs used in biotechnology and food safety by the three news magazines.
3. Determine if there is similarity in the technical methods in the photographic content.
4. Determine the number of staged and non-staged photographs used by the magazines.

The purpose and objectives of this study are based on evaluating research in agricultural communications, visual communications, and semiotics.

The researcher recognizes that several limitations exist within the study. One limitation is the bias of the researcher. Having an agricultural background, the photographs could be interpreted differently by someone with a different background. Therefore, reproducing this study may not yield the same results.

Due to the time frame of this study and the topic of food safety, an abundance of photographs were used with stories about mad cow disease. These photographs were of such things as burning beef carcasses, a headless cow being moved by a pallet jack, and a motherless family.

The last observation about this study is that the magazines evaluated in this study do not claim to be unbiased publications. This study is therefore, merely a snap shot of the visual content in these magazines relating to this topic.

CHAPTER II

REVIEW OF LITERATURE

This research is concerned with how agriculture and agriculturalists are portrayed through images in news magazines and how that affects the publics' perception of the agricultural system. Research in agricultural communications and extension has focused primarily on the quality of reporting agricultural issues and the effectiveness of agricultural communications through written content. This research will analyze images that accompanied stories about biotechnology in popular press news stories in 2000 and 2001, using semiotic analysis.

This literature review will examine agricultural communication research to gain an understanding of what is known about the subject, examine research in media and visual literacy to gain an understanding of the role that images play in building perception, and examine the semiotics methodology and how it has been used to evaluate the meaning of images used in the media.

Agricultural Communications Research

Research in agricultural communications has examined the treatment of agricultural issues in the popular press. Whaley and Doerfert (2003) sought to quantify the nature of food safety coverage by *Time*, *Newsweek*, *U.S. News & World Report*, and *Business Week*, using content analysis. This study found that stories about food-borne illnesses appeared most frequently in the magazines, and stories about technological advances, second. The most quoted sources were governmental officials.

Whaley and Doerfert (2003) wrote:

Understanding how a major mass media channel such as news magazines reports food safety and related risks can enhance the ability of agricultural communicators and university specialists to support the news industry and increase coverage of food safety-related university research (p.18).

Prior to this study, Whitaker and Dyer (2000) examined articles in *Time*, *Newsweek*, and *U.S. News & World Report*, and included an analysis of the top three circulated agricultural magazines—*Farm Journal*, *Progressive Farmer*, and *Successful Farming*. The Whitaker and Dyer study sought to determine if the sources used in a news story affect the balance of the story. The study found that the highest percentage of environmental and food safety stories were reported in news magazines (62.1%) and that both the news magazines and the agricultural publications used sources in educational and governmental roles. However, agricultural publications used agricultural sources and did not have any activist sources, whereas data showed that news magazine sources used activist sources, revealing a contrast in the way the two industries report news.

These studies showed that different news organizations seek different sources and choose different angles when presenting agricultural news stories. Therefore, it is important to examine journalists' understanding of basic agricultural knowledge. These studies illustrate a need to monitor how the popular press reports agricultural news.

Stringer (1999) found that when surveying managing editors and reporters employed at Pennsylvania newspapers, over 70% of those surveyed considered food safety and human health as agricultural topics, among other topics such as pest and disease control, farmland development, and gardening. Over 90% of those surveyed

indicated that they considered environment, business, and water quality to be agricultural topics.

Haygood, Haygins, Akers, and Keith (2002) found a 22% increase in the number of agriculturally-related articles from the Associated Press news dispatches from 1997 to 2000. Their study revealed that less than one-half of statements made within the stories were based upon facts.

Examining the perceptions of future agricultural reporters, Wingenbach, Rutherford, and Dunsford (2003) found that agricultural communication students are forming their opinions on biotechnology based on their experiences in their science classes. Additional findings showed that respondents felt differently about what was acceptable for genetically modified plant life and human life. The respondents' most frequent objection was based on an environmental concern and was least concerned with the religious and ethical considerations.

Zillmann, Gibson, and Sargent (1999) found that one-sided photographs were more influential than neutral photographs when a population was exposed to a number of photographs and their perceptions of issues were measured. The populace recalled the compelling photographs more easily.

The previous studies verify that there is a need to examine agriculturally-related stories for bias and to question journalists' proficiency at relaying these stories to audiences. There are various knowledge levels, as well as previous perceptions among the public about biotechnology and food safety topics.

Grunig, Nelson, Richburg, and White (1988) concluded that agricultural audiences actively seek helpful information and are in turn educating themselves. Frick,

Kahler, and Miller (1991) defined agricultural literacy as “the understanding and knowledge necessary to synthesize, and analyze, and communicate basic information about agriculture” (p. 54). There is a need to examine how the information is presented and if it accomplishes the purpose of informing and educating the consumer with an accurate portrayal of the relationship and nature of biotechnology and agriculture.

The studies conducted about the nature of agricultural topics in popular press show that there is a need for further research concerning agriculture in the news media. The lack of visual studies also indicates a gap in the research that must be filled.

Although visual content has not been closely in the subject of agriculture, visual and media literacy are topics that have been studied for centuries. A vast amount of research has been conducted on media literacy and the influence it has in people’s lives.

Media Literacy

Lester (1995) quoted Walter Lippmann as saying: “Whether right or wrong...imagination is shaped by pictures seen...consequently they can lead to stereotypes that are hard to shake” (p.100).

To fully understand how images create stereotypes, it is important to first understand how media create messages and how one becomes media literate.

Potter (2001) wrote that people exist not only within the physical world, but also within a media world and must therefore understand this second world they live in. He defined the media literate individuals as those who actively interpreting the messages and can therefore control the meaning of the message and effects the messages can have in their lives.

The process of interpreting messages is an active process. Lester (1995) wrote that in order to find meaning within a photograph, the viewer must actively concentrate on the subject of the photograph rather than just observing the photograph.

Barry (1997) further explained this process of drawing meaning from the media as, “Our brains combine information from our eyes with data from other senses, synthesize it and draw on our past experiences to give us a workable image of our world” (p. 15).

These “media worlds” are revealed in the following studies. These studies all identified a social group and examined how the treatment of the group in the media led to stereotyping and perceptions created about the group.

Fahmy (2004) examined Associated Press photographs depicting Afghan women during the war with the Taliban as a result of the September 11, 2001, attacks. The study found that the AP wire photographs brought forth a “more complex version on the Afghan women” because they were shown still wearing the burqas. The burqa can be interpreted as a symbol of captivity, and while the Afghan women had gained freedom, they still chose to wear this symbol. While the media was communicating the story about their fight for freedom, it chose images that portrayed their captivity.

Griffin (2004) examined *Time*, *Newsweek*, and *U.S. News & World Report* to compare the photographic coverage of the Gulf War, the War in Afghanistan, and the War in Iraq. He found that the most frequently used photographs were of the military and that the photographs aligned with the government’s position and did not offer fresh perspectives.

The Reading Red Report (Briggs, Arviso, McAulliffe, & Edmor-Supah 2002) found that news coverage about American Indians made generalizations in stories as a result of the journalists' assumptions of American Indian culture, based on an education received in grade school. The report called for a need for style in association with reporting American Indian news.

Sultze (2003) examined a special issue of *The New York Times Magazine* created by women about women. She found that although the issue attempted to show women as powerful it reinforced traditional stereotypes. She concluded that in order to change the image of women, the structure of media production must change.

Just as the above authors examined select groups, this study will also look at how the agricultural community is depicted through images.

Trumbo (2000) called attention to the importance of researching visual images used to communicate scientific information, based on research that indicated few people have an understanding of basic scientific facts despite Americans viewing a significant amount of scientific media. Trumbo (2000) wrote that there is a great opportunity for research in visual communication in communicating scientific information and he challenged scholars to examine visual literacy within their areas of research.

Huxford (2001) wrote that the claims of objectivity by the media were not supported by the evidence in his analysis of visual media used by the press. He found the need of the media to prove stories through inclusion of pictorial representations. This drives news media professionals to create photographs, even when the subject does not lend itself to visual portrayal.

Research established that media image choice affects the public's perception of demographics. Fairhurst and Sarr (1996) wrote, "When we choose to highlight some aspect of our subject, we choose which aspect or portion we will focus and which to exclude" (p. 4) Therefore it becomes necessary to examine research to uncover why photographers capture certain images and what factors influence what is actually printed and distributed through mass media channels.

Tagg (1988) wrote that a camera is given power through its purpose to record events and it is not neutral. Therefore, choosing camera settings and shot angles are no longer insignificant decisions, as they have lasting consequences in the communication of the message.

Bolack (2001) found through an ethnographic study that photojournalists surveyed were aware of the types of photographs that the editors and management of their newspaper would use in stories. A standard or expectation is therefore placed on the photographer and influences the images captured.

Barry (1997) wrote that it is important to realize that photographs can be used in manipulation by organizations. Like Bolack (2001) this affirms that editors can have an influence in determining not only what images are used, even what images are captured.

Taylor (2000) wrote that the nature of news will keep the public from having an accurate visual portrayal because pictures are used to provide sensationalized images rather than the documentary style photographs that were once highly valued.

Singletary and Lamb (1984) found, through an analysis of National Press Photographers Association-winning news photographs, that images that containing emotion and feature photographs depicting hardship were most frequently chosen as the

winning photographs. The researchers concluded that photographs cannot be seen as reality because there is an expectation of what a photographer should capture. In order to become an award-winning photographer, news photographers must be able to capture emotionally charged, negative images of violence, crime, and disasters, and feature photographers must be able to capture positive images of triumph and courage.

The NPPA code of ethics is to “promote the highest quality in all forms of photojournalism.” The code commits photojournalist professionals to capturing accurate and balance images (www.nppa.org), suggesting that consumers of mass media should be able to view the images as accurate portrayals of reality. One of the many ways to determine the messages of the images and if they portray reality is to use a semiotic methodology.

The code revealed that a high standard is placed upon photojournalists in reporting truthful images. However, many of the authors believed that certain factors and expectations keep that purpose from being accomplished. Therefore, it is necessary to monitor the messages and amount of influence the factors have in producing the messages through the image.

Theoretical Framework -- Semiotics

Chandler (1994) wrote that the shortest definition of semiotics is simply “the study of signs” (para. 1) derived from the Greek word semeion, which means “sign.” (Bignell, 2002). F. de Saussure and C.S. Pierce are credited with the innovation of semiotics. Roland Barthes is well known for his work in semiotics and for bringing the concepts to the visual communication field. (<http://www.tcw.utwete.nl>)

Saussure (1959) wrote that a person lives in a world shaped by decoded signs found in images, actions, words, and more, which he or she has encountered. The purpose of semiotics is to become aware of the construction of reality created by those signs (Chandler, 1994). In doing this, the researcher is able to understand how the audience will decode the message, create that reality, and give insight into the culture (Bignell, 2002).

Chandler (1994) wrote that interpreters must have social knowledge, medium and genre knowledge, and ability to understand the relationship between the two. Stuart Hall (1980) wrote that culture itself is a kind of communication, producing meaning and highlighted the importance of active interpretation within relevant codes. He identified a circuit of communication including: production, circulation, distribution/consumption, and reproduction (Hall, 1980). Bignell (2002) wrote that Barthes called the message that is created through the signs in the image the making of a “myth,” which is how one sees the objects in a photograph and the feeling and ideas it creates within the viewers mind. This myth is what concerned this study as well as the previous studies involving different cultural and social groups.

Chandler (1994) wrote that understanding messages reveals the equality of the messages that create that reality, and Moriaty (1997) wrote that using the semiotic methodology in visual communications is ideal because the cognitive processes and interpretive processes are parallel.

Danesi (2002) found that the semiotician is concerned with what a certain structure means, how it is able to represent what it means, and why it means what it means. In image-based research, identifying these signs within a photograph gives insight

into the meaning of the photograph and what that photograph will mean to the average viewer.

Bignell (2002) explained the concept with the example of a Rolls-Royce. The car is a material signifier, a symbol that not only communicates the make of the car, but also communicates a mental concept of wealth and luxury. When the average viewer sees a photograph of this car, several messages are being communicated through this single image. Each of these messages is a different sign.

There are three types of sign in semiotic methodology: symbolic, iconic, and indexical and they illustrated in Figure 1.

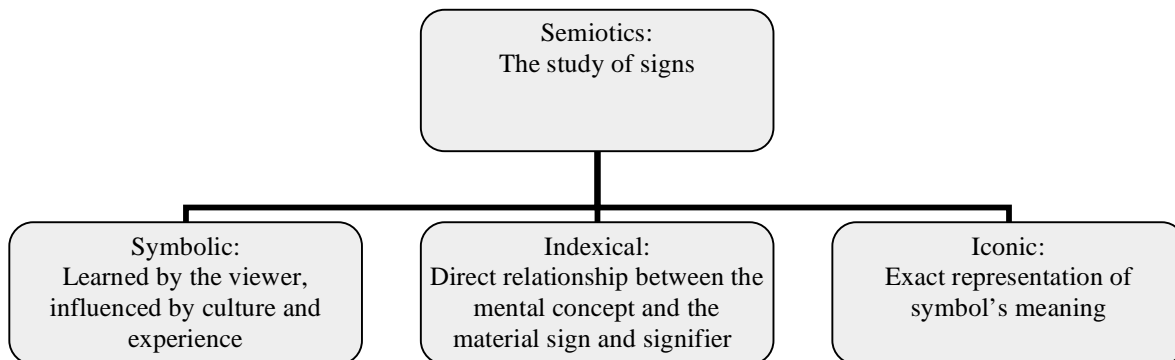


Figure 1. Diagram of semiotic framework

Chandler (1994) wrote that a symbolic sign is learned by the viewer, as the signified and signifier do not directly resemble each other making them difficult to determine. In the example of the Rolls Royce, the car is a symbol of luxury or wealth.

Bignell (2002) wrote that indexical signs have a direct relationship between the signified and the signifier. The viewer could draw the conclusion that the owner was a wealthy person.

Iconic signs represent what they are and are very easily determined. The image used in the example represents an automobile. It is therefore possible to have symbolic, indexical, and iconic signs in one image.

Deprawt (2002) explained how semiotics was used to analyze the photographic representations of the Japanese during the attack on Pearl Harbor and the representation of terrorists after September 11, 2001, in the *Washington Post* and the *New York Times*. Deprawt's research found that the media played a role in developing the perception of the enemy. His findings indicated that analyzing images using a semiotic methodology provided researchers with information about the content of the images, and also with an understanding of how the audience would interpret the image, and the effect it could have on building perceptions. Deprawt wrote that the news media work with power structures to create an image of "otherness" about an adversary of the United States. Therefore, just as Deprawt uncovered the perceptions that media can create about other cultures, it is just as important to understand how images concerning biotechnology and agriculture shape public opinion.

Methodology

This study will employ the use of a quantitative content analysis to report frequency data. Gall, Gall and Borg (2003) identify quantitative content analysis as a primary method for examining the messages encoded in various forms of communications, including visual media. They also identify five steps in conducting a content analysis.

CHAPTER III

METHODS

This study employed descriptive and quantitative methods to analyze the photographs in the 2000 and 2001 issues of *Time*, *Newsweek*, and *U.S. News & World Report*. A semiotic analysis was employed to meet the research objectives.

1. Determined the messages conveyed through the photographs used in food safety and biotechnology stories in *Time*, *Newsweek*, and *U.S. News & World Report*.
2. Compared the messages conveyed through photographs used in food safety and biotechnology stories by the three news magazines.
3. Determined if there is similarity in the technical methods in the photographic content.
4. Determined the number of staged and non-staged photographs used by the magazines.

In order to meet the objectives set forth in this research, this study employed semiotics to examine the photographs used in news stories about agricultural biotechnology. Chosen for its wide amount of usage, semiotics was found to be the best method for identifying the messages of the photographs and how it communicates messages to certain cultures.

The photographs were hand-selected through a review of the table of contents in *Time*, *Newsweek*, and *U.S. News & World Report* in 2000 and 2001 for stories relating to food safety and biotechnology by an expert panel. Examples of stories selected included

animal diseases, cloning, and food handling procedures, as these were controversial topics at that time.

Time, *Newsweek*, and *U.S. News & World Report* were chosen based on their high circulation and their usage in the Whaley and Doerfert (2003) study and the Whitaker and Dyer (2000) study, making this study compatible with previous research.

All three magazines chosen for the study are weekly, general interest consumer news magazines. The magazine's circulations range from 2 million to 4 million (Bacon's, 2004). Although having the same classification, the three magazines all have very different purposes. *Time* strives to be the "Great American magazine, reflecting the interests, the values and the ambitions of the American and her people" (Bacon's 2004, p 1451). *Newsweek* strives to report "the weeks developments on the news front of the world and nation..." (Bacon's 2004, p1444) and *U.S. News & World Report* strives to report "timely, informative, and compelling features...(Bacon's 2004, p1457).

Once a story was identified within the index and agreed on by the panel, it was examined for photographic content. If it contained photographic images, the pages were scanned into the computer and saved as an Adobe Photoshop document. Only photographs were considered and other visual elements such as illustrations, graphs, and charts were not included in the study.

A copy of each magazine page was scanned and saved; the photographs were then extracted from the story and saved in a separate folder.

A photograph that appeared to be a stock image, or one that was not taken strictly for the story assignment was not considered. This also included images that were provided by non-professional photographers, such as photographs of people that had died

of mad cow disease. These images were snap shots of people and were not taken with the intended purpose of illustrating a magazine article. They therefore offered insight into image choice, but were not compatible with the objectives of this study.

Photographs that were questionable to determine if it was a stock photograph or not were kept in the study. A total of 45 images were included in the study.

A semiotic analysis was employed to meet the research objectives. In instituting a semiotic methodology, it is important to look at the denotative (what is seen by a viewer) and the connotative (what that will mean to a viewer within a certain culture). The messages were interpreted based on an American culture.

Bignell (2002, p. 11) wrote: "The same principles underlie the semiotic study of visual sign and linguistic signs. In each case, there is a material signifier, which expresses the sign, and a mental concept, a signified, which immediately accompanies it."

A photograph is both an indexical and iconic symbol and includes such codes as genre, camerawork, editing, lighting, and color (Chandler, 1994).

Codes are the rules and constraints that guide the researcher in the meaning making task, as they are used in production of the meaning as well as its interpretation (Chandler, 1994).

The system of codes used in the analysis was the genre, the main subject of the photograph, and staging of the photograph. The researcher examined the camerawork and technical aspects used in capturing the photograph.

The first elements the researcher analyzed were the technical elements of the photograph, which included depth of field, shutter speed, angle, lighting, exposure, and focus. An instrument was developed by the researcher and can be found in Appendix B.

The instrument was developed to guide in the interpretation process of each photograph and provided a consistent, organized method for interpretation. The instrument was based on common photographic knowledge and semiotic research. Through these data, the researcher assessed if there was a trend in the types of pictures photographers captured.

The photographs were classified into categories according to the main subject of the photograph. This provided a numerical representation of the nature of agricultural biotechnology photographs used in the magazines.

The researcher used the semiotics in order to gain insight into messages these photographs could communicate to viewers by looking for signs that would communicate a message to the United States populace. In order to read a photograph it is important that the researcher understands the culture interpreting the photograph (Chandler, 1994). He wrote that interpreters must have knowledge about the culture of the message, the medium and genre, and ability to understand the relationship that exists between them.

These data gave insight into the presentation of food safety and biotechnology issues to the American consumer and how these messages could be interpreted. It can be used as an indication of the treatment of agricultural issues by these popular press magazines.

Through the collection of these data, the agricultural communications industry will better understand how news magazines are disseminating messages about agricultural information through visual content. This will provide a new perspective on how photography and image choice should be taught in agricultural communication classes.

The researcher recognizes that several limitations exist within the study. One limitation is the bias of the researcher. Having an agricultural background, the photographs could be interpreted differently by someone with a different background. Therefore, reproducing this study may not yield the same results. With a background which has allowed the researcher to experience some of the situations presented in the photographs, a different interpretation than that of an average American could be expected.

Due to the time frame of this study and the topic of food safety, an abundance of photographs were used with stories about mad cow disease. This had an effect of the proportion of food and animal photographs. These photographs were of such things as burning beef carcasses, a headless cow being moved by a pallet jack, and a motherless family. A different time frame would probably yield different results.

The last observation about this study is that the magazines evaluated in this study do not claim to be unbiased publications. This study is in no way making accusations about the news magazines and acknowledges that this study will not affect the way these magazines report the news.

The following terminology will be used in this research in evaluating the technical aspects of the photographic content.

Aperture controls the amount of light that the lens allows to enter the camera, which affects the depth of field, allowing the photographer to control what is in focus in the photograph.

Shutter speed allows the photographer to determine how long the shutter remains open. A photographer can use this setting to show movement or to stop action.

The lighting used in a photograph will create a mood and feel of the image. For example, a subject may appear mysterious in dim light or healthy in the noon sun. This allows the photographer to create a feeling with the image.

Perspective is an element of an image that gives the illusion of distance and depth. Through this choice, the photographer can make objects or people appear larger than life or can also make them appear very small.

The following terms are used in constructing the framework of the study. Biotechnology is the use of microorganisms or biological substances for industrial purposes. Semiotics is the study of the meaning of signs in aural, verbal, or visual presentations (Lester, 1995).

CHAPTER IV

RESULTS

This purpose of this study was to analyze the use of photographs in biotechnology and food safety stories in *Time*, *Newsweek*, and *U.S. News & World Report*. This study examined a sample of 45 photographs used with biotechnology and food safety stories in *Time*, *Newsweek*, and *U.S. News & World Report*. The results from the research indicate that there is a difference in the number of positive and negative photographs used by the three newspapers, but there were similarities in their shot choices. The results also indicate a similarity in the technical methods the photographers use to capture the images, as well as their shot choices – staged or non-staged.

Objective 1

Determine the messages conveyed through the photographs used in food safety and biotechnology stories.

The researcher looked for signs within the photographs to determine how the public would interpret the photograph. These signs are iconic, indexical, and symbolic (Bignell, 2002). Through examination of each photograph, certain signs were detected and common themes emerged from the photographs.

With the exception of six photographs, the photographs could all be classified into five categories, with the exception of six photographs. The categories were: food, animals, scientist, producers, protestors, and foreign nations. The photographs were classified according to the main subject of the photograph. Some photographs could fall into one or more categories.

Food

Photographs in this category were photographs of food in all forms: processed, raw, and cooked. This category contained photographs that were pictures of meat, sandwiches, and vegetables.

Many of these photographs were positive, based on the healthy appearance. This could be interpreted as an indexical sign meaning the food is safe to eat. Photographs such as Figure 2, captured what appeared to be fresh, safely packaged tomatoes that indicate a healthy product to the viewer. This photograph could trigger a positive response from the viewer about the subject before the article is read. Likewise, Figure 3 is a close-up shot of what appears to be healthy, fresh hamburger meat in a clean environment. The meat does not have discoloration or other visual signs that would indicate to a viewer that the meat would be unsafe to eat.



Figure 2. Positive representation of tomatoes

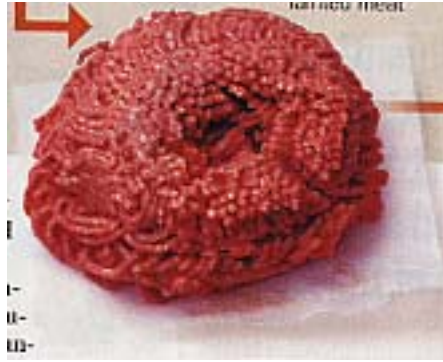


Figure 3. Positive representation of ground beef

Figure 4 indicates a different message. The Porterhouse steak is on a clean stainless steel surface, which would be an indexical sign indicating to the viewer the meat is in a sanitary environment. However it is wrapped in yellow caution tape with the words: caution do not eat. To the reader, this is symbolic of a dangerous situation, which indicates that the meat, although healthy in appearance should not be eaten.



Figure 4. Negative representation of steak

Animals

Photographs classified as animal photographs included animals both alive and dead. These photographs included people, but the subject of the photograph was the animal.

These photographs, like the food photographs, included photographs of animals with positive and negative classifications. Photographs such as chickens, lambs with a shepherd, sheep without grass are good examples of this observation. The photo of the chickens in Figure 5 shows caged chickens with their heads out of the cage. The large number of chickens in the small amount of space is an indexical symbol that would indicate to the viewer that the chickens are in tight quarter and are uncomfortable. Many American viewers would see this as ill treatment of the chickens.



Figure 5. Example of a negative animal photograph

Likewise, there were photographs of well-cared-for animals. These photographs such as doctor with pig and man holding lamb, in Figure 6, show the animal being held

by a person. People hold things that are important or purposeful; therefore it is an indexical sign that the animal is important and is being cared for because it is important to that person.



Figure 6. Example of a positive animal photograph

Other photographs which can be found in Appendix A, show animals in unnatural situations, such as being used in science experiments, like Figure 7. The indexical signs of wires in the case of the crab shown in Figure 8 lead the reader to draw the conclusion that this crab is not in its usual environment and is being used in an experiment. The photograph of the scientist with bobcat depicts a woman smiling as she holds a hissing bobcat. The hissing of the bobcat, in Figure 9, is an indexical sign that the animal is in an uncomfortable situation. The leash is a symbolic for a domesticated animal in captivity. These photographs illustrate agricultural science in a negative light, by communicating

the animal's situation instead of the possible photograph of a person who may be benefiting from the research.



Figure 7. Example of pigs used in science



Figure 8. Example of a crab used in science



Figure 9. Example of a negative portrayal of an animal used in science

Scientists/Food Industry Workers

This category included photographs that involved scientists and food industry workers. Additional photographs can be found in Appendix A of the photographs in this classification. The symbol of a white coat indicates to the viewer that the individual has a high amount of education. Generally, professions that require white coats are highly respected.

This prevalent sign was in the majority of the photographs. This is a symbol of a scientist, in Figures 10 and 11, and easily distinguishes a person working in a science industry.



Figure 10. Scientist holding tomatoes

The photograph of the man leaning over the counter, in Figure 11, makes it difficult to determine his profession. Although he may be a scientist as indicated by the equipment in the background, not having a white coat, he does not immediately gain the viewers respect. A viewer may also not immediately trust his information or knowledge.



Figure 11. Man leaning over counter

The workers in the meat industry were wearing white coats, but were also wearing protective items such as hairnets, gloves, and safety glasses. This photograph is shown in Figure 12. This is an indexical sign that would indicate to a viewer that they must be extremely cautious when handling food products. These photographs are considered positive because the safety items would be reassuring to a viewer questioning the safety of the food supply.

Another observation was that the photographs of food safety workers were action shots captured while they performed their jobs inspecting food. The photographs of scientists tended to be portrait-style photographs. While this does not directly relate to the determination of the positive or negative value of the photograph, it could be a code to a viewer about what was of greater importance--the individual in the photograph or the action that is taking place.



Figure 12. Example of a food industry worker photograph

Producers

Photographs in the category of producers included agricultural producers. In all three pictures of American producers, the subjects were white, older males and the photographs were always taken with either an animal or a crop. Each of the subjects was dressed in familiar “farmer” attire. Figure 13 illustrates an example of a producer photograph.



Figure 13. Example of a producer photograph

Foreign

Foreign photographs were classified based on qualities they had indicating that the photographs were taken in a different country. In these pictures, the dress and living conditions of the people indicate a low socio-economic status. For example, in Appendix A, the photograph of the children smiling indicates they feel positively about their situation. However, there are holes in their clothes, which is an indexical sign that a viewer would link with not having a lot of money. They are standing in a tall, green field, which is an indexical sign that they could have a good harvest that year. The photographs

classified as foreign in general show the people doing manual labor, which allows the reader to draw the conclusion that they are not wealthy.



Figure 14. Example of a photograph in the foreign category

Positive and Negative

The researcher used signs within the photograph to judge whether the message was positive, negative, or neutral toward agriculture. A positive photograph was one in which the subject is captured in a way that would make the viewer feel positively toward the subject of biotechnology and food safety. Positive photographs in this study included healthy, well-cared-for animals, fresh meats and vegetables, and individuals with positive expressions. An example of a positive photograph is shown in Figure 15.

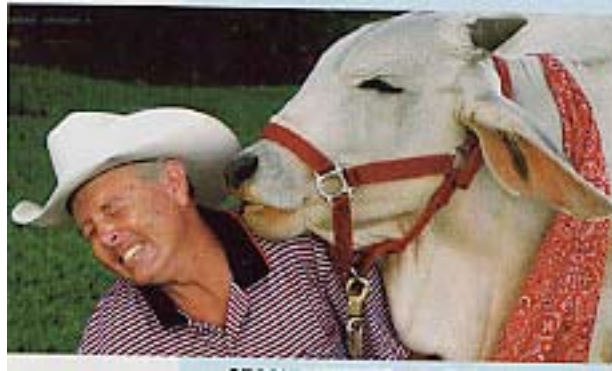


Figure 15. Example of a positive photograph

Negative photographs include such things as protestors, animals in poor conditions, and frightening pictures of piles of burning beef carcasses. Figure 16 is an example of such a photograph. These photographs shock, scare, and sadden the reader with the negative messages.

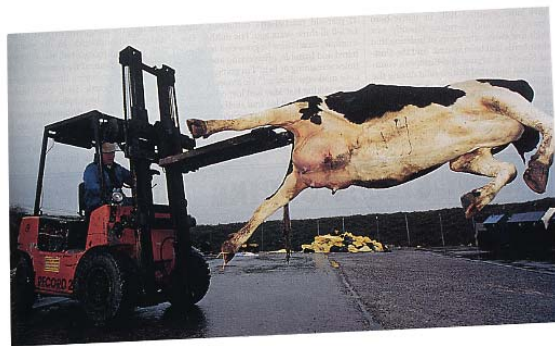


Figure 16. Example of a negative photograph

Neutral photos do not depict communicate a message due to a lack of signs or convey both positive and negative emotions. The best example of a neutral photograph is

Figure 17. This photograph depicts the size difference in the two salmon, but does not portray one as better than the other.

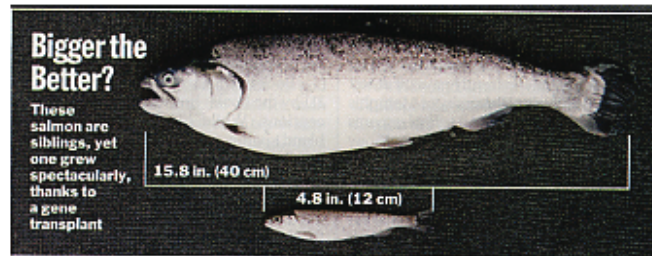


Figure 17. Example of a neutral photograph

Although captions and headlines can sway the meaning of a photograph, this study looked only at photographic content. The meanings and classifications were based strictly on how the viewer would interpret the photograph alone, without reading the text.

Objective 2

Compare the messages conveyed through photographs used in food safety stories by the three news magazines.

Table 1 depicts the number of photographs examined and the percentage of positive and negative photographs in the study.

Table 1. Analysis of the messages of photographs in sample

Source		<i>Time</i>		<i>Newsweek</i>		<i>U.S. News & World Report</i>	
Category		n	P	N	P	n	P
Positive		6	60.0	6	40.0	9	47.4
Negative		1	10.0	8	53.4	6	31.6
Neutral		3	30.0	1	0.06	4	19.0
Total pictures		10		16		19	

- This number reflects the number of photographs included in the study. Photographs that were stock images or were supplied to the magazine by an outside party were not included in the study.

Objective 3

Determine if there is similarity in the technical methods in the photographic content.

The technical methods of lighting, aperture, and shutter speed were examined to determine if there is a similarity in the techniques that magazine photographers use to capture images. These methods allow the photographer to control the mood and feeling of a photograph and exclude and include information.

Depth of field was evaluated as either deep or shallow based on how much of the picture was in focus. A deep depth of field was a photograph that was completely or mostly in focus. Shallow depths of field were those photographs in which only the

subject was in focus. This study found that 28, of the photographs were determined to have a deep depth of field, while the remaining 17 had a shallow depth of field.

Lighting was examined by looking at how the photographer chose to utilize the light surrounding the subject in the photograph. The photograph was labeled as either bright or dark. In a bright photograph, the photographer used natural or artificial light to produce a bright, clear photograph. Photographs that contained heavy shadowing or were difficult to see as a result of the lighting were classified as dark. This study found that 10 of the 45 photographs were dark or heavily shadowed.

The exposure was determined by looking at the amount of movement that could be seen in the photograph and were classified into two categories—long and short. A long exposure will showed blurred movement, and a short exposure freezes the action. A third category of no movement was added when some photographs contained no action and the length of the exposure could not be determined. The results found that 1 of photographs had a long exposure, 27 had a short exposure, and 37% (17) contained no detectable movement.

Focus was determined according to whether detail and strong lines could be seen. A soft focus would appear slightly blurred. The photographs examined showed 100% to be in sharp focus.

Objective 4

Determine the amount of staged and non-staged photographs used by the magazine.

This study defined staged photographs as those in which the photographer set up and posed the subject of the photograph. Staged photographs included people, animals, and objects. Figure 18 is an example of a staged photograph.



Figure 18. Example of a staged photograph

A non-staged photograph was defined as one in which the photographer captured an actual occurrence, such as Figure 19.

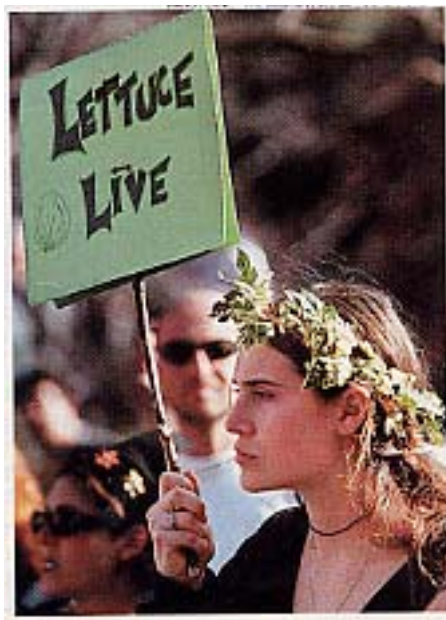


Figure 19. Example of a non-staged photograph

Tables 2, 3, and 4 illustrate the breakdown of staged and non-staged photographs used in the magazines.

Table 2. Number of staged vs. non-staged photographs used in *Time*

	Positive	Negative	Neutral
Staged	3	0	2
Non-staged	3	1	1
Total	10		

Table 3. Number of staged vs. non-staged photographs used in *Newsweek*

	Positive	Negative	Neutral
Staged	2	5	0
Non-staged	3	3	2
Total	15		

Table 4. Number of staged vs. non-staged photographs used in *U.S. News and World Report*

	Positive	Negative	Neutral
Staged	2	4	1
Non-staged	6	5	1
Total	19		

Table 5 summarizes the total staged and non-staged photographs in the popular press magazines.

Table 5. Total staged and non-staged photographs in the three magazines

Category	Staged	Non-staged
	19	26
Total	46	

CHAPTER V

DISCUSSION AND CONCLUSION

As Whaley and Doerfert's (2000) purpose to understand how the mass media report agricultural issues, so the first concern of this study was to support that purpose through visual research. The visual content was first examined to determine whether the coverage of agricultural issues were positive or negative. This study found that there was a difference in the way the three magazines used images to report these issues. *Time's* image content was extremely positive and also had a large amount of staged photographs. This supports Huxford's (2001) findings that the media was not objective and that photojournalist are driven to create photographs. However, *Time* also had the lowest number of photographs about the topic, which indicates that there is an element of exclusion to consider in these results. As Faihurst and Sarr (1996) stated that in choosing what to highlight we also choose what to exclude, the results indicate that *Time* could be excluding information about agriculture. According to Bacon's (2004), *Time* has a 90 day lead time for their feature stories. It also states that *Time's* purpose is reflects the interests of the American people and do not claim to be unbiased. *Newsweek* had the largest percentage of negative photographs, however they had only one neutral photograph. This more biased coverage in the photographic content is a reflection of the purpose of the magazine stated earlier (Bacons, 2004). *U. S. News & World Report* had a slightly more positive percentage of photographic content and included the highest number of neutral photographs. However, the strictly number of positive and negative photographs does not completely reflect the treatment of agricultural issues through photographs or give insight into what messages these images are communicating to the viewers.

Through semiotic examination of the photographs, themes emerged from within the issue of agricultural biotechnology and food safety. Five themes emerged: food, animals, scientists, food industry workers, agricultural producers, and foreign nations. The majority of the photographs could fit into one or more of these themes. Only 8 of the 47 photographs did not fall into one of these categories.

This is evidence that photographers are taking the same types of photographs and capturing the same images for biotechnology and food safety stories. Consequently, the media world that is created through the photographs introduces or reinforces stereotypes (Potter, 2001) about agriculture, especially biotechnology and food safety issues. For example, because of the time frame of this study and the topic of food safety, an abundance of photographs was used with stories about mad cow disease. These photographs were of such things as burning beef carcasses, a headless cow being moved by a pallet jack, and a motherless family. These photographs can be found in Appendix A. These photographs are graphic and call for an emotional response from the reader. The photographs consistently communicate the same messages about mad cow disease before the viewer reads the article.

The Zillmann, Gibson, and Sargent (1999) study found that compelling photographs are more easily recalled and shape viewers perception more so than non-compelling photographs. The use of negative photographs will shape viewers perceptions more so than neutral or negative photographs. Therefore, the messages of the photographs are the primary indicator of the messages that shape the viewer's perceptions.

This research agrees with Trumbo (2000) that it is important to research visual images used in stories about scientific information. The general public does not actually know the scientific facts about mad cow disease or other biotechnological issues and must therefore rely on news reports for that information. Photographs can therefore elicit an emotional response from the reader without communicating factual information.

Another observation in this research was the semiotic signs used in the photographs. Iconic, indexical, and symbolic signs were found from among the photographs, communicating messages to the audience about the agricultural issues.

Although some would say that meaning is made from a photograph only if the viewer is actively reading it (Lester 1995), this research found obvious signs emerge in many of the photographs that convey an obvious message without seeking for a meaning.

The best example of this is seen in the steak with caution tape around it, shown previously in Figure 3. This photograph obviously conveys the message to the reader that eating beef is harmful through the use of the symbolic caution tape. This caution tape is a symbol used to convey the messages of do not enter or avoid a dangerous situation. The viewer would obviously know that the message of that photograph indicates that the steak, an indexical sign for beef, is unsafe.

Another example of a negative photograph is the photographs of the forklift moving the dead cow, shown in Figure 15. This photograph, although unusual, illustrates the mad cow epidemic in a very disturbing way. This photograph, unlike the above photograph differs in that this photograph captured an actual occurrence and communicates factual information, even though the information is negative. This information would be what would have the most impact on the reader, and as the

Zillmann, Gibson, and Sargent (1999) study found, be what the viewer remembers and forms their opinions based on.

These findings show that even though numerically the photographic content is considered balanced, stereotypes and symbols show that photographic could still have negative consequences. The messages that these photographs convey have a much greater impact on the viewer's perceptions.

This study found that news magazine photographs are generally not artistic. The large number of photographs taken with the same technical methods indicates that there is a standard or expectation for capturing a news photograph. This research indicates that a photographer is expected to provide visual content that is in focus and visually shares the facts of the issue. The photographs have a deep depth of field, in sharp focus, and are well lit. However, some photographs that were considered dark contained heavy shadowing. The shadows were used to create a feeling of danger or unknown.

Although this study produced few examples, the photographs that used heavy shadowing as an effect, represents the power the photographer has in the use of light. For example, in the photograph of the woman holding tomatoes as shown in Figure 10, the light creates a dark, mysterious feeling to the photograph. The woman is therefore portrayed with a "mad scientist" appearance.

This research also produced instances in which all the photographic elements are within the control of the photographer. This study found that 19 of the 47 photographs appeared to be staged. There was not a connection between whether or not the photograph was staged and its classification as positive, negative, or neutral. However, it does indicate that photojournalists do possess a power to influence the message.

This study found that the news magazines used even numbers of staged and non-staged photographs. Huxford (2001) found that the media were not objective in their photographs. He found that the pressure to include visual images led media professionals to create images they did not have. This study supports Huxford's findings in the large number of staged shots found in the sample of photographs. The Society of Professional Journalists writes that it is unacceptable for journalists to distort pictorial content (www.spj.org).

The large number of stage photographs supports Taylor (2000) in that sensationalized images are now more prevalent than the documentary style, which was once used to report news. The findings of this research support this statement, revealing that the different priorities are placed on visual content than its journalistic value.

Recommendations

The findings of this study can be applied in various ways:

1. Agricultural communications and journalism departments should teach digital photography classes. This study found that there is a need for photographers to have more knowledge about the subjects that they are shooting. Therefore, it would benefit the agricultural industry if students were trained in photographic technique and could take magazine-quality photographs.
2. Agricultural communications and journalism departments should prepare students to be visually literate. Students need to become aware of how to read a photograph. Becoming visually literate will allow students to not only understand how photographs impact their perception of issues, but also to understand the importance of image choice when educating their audience. Knowledge of what is

valuable as visual content is essential in understanding how to better report the agricultural story.

3. Cooperative extension and professional agricultural communicators should become more aware of the photographs they supply to the media. The Cooperative Extension Service and agricultural entities, in their effort to educate the public of agricultural issues, should be aware of image choice and the perceptions and stereotypes these images could create. Livestock Publications Council and Agricultural Communicators for Excellence should have seminars and lectures to educate these professionals on the impact of image choice.
4. Individuals with different backgrounds and with different subjects should repeat this study. As one of the limitations of this study is the researcher's bias, this study needs to be repeated. It is important that future research be done to fill the gap the currently exists in agricultural communications image-based research.

This study dealt with the subject of agricultural biotechnology and food safety, but other agricultural topics and issues could yield different results. Controversial and non-controversial issues could yield different results in the messages of the photographs. Research should also examine the images produced by agricultural magazines and news sources, because this is where agriculturalists have the most control in the messages. The two groups should compare agricultural publications and popular press to determine if there is a difference in the treatment of a subject.

Image-based research should be conducted within different mediums—television, newspaper, and Web sites should all be examined for visual content. The photographs

should also be evaluated according to criteria set forth by national photojournalism and journalism organization codes of ethics.

Headlines and captions should also be examined and how they affect how the viewer perceives the message of the photograph. Together, words and photographs have the greatest impact and would give insight not only into photograph selection, but in writing captions and headlines that are powerful, yet balanced.

Additional research needs to be done to determine the direct effect these images have on perceptions. Viewers interpret messages of photographs based on their own experiences, prior messages, and stereotypes. It would benefit the research community to determine how different groups will interpret the messages of the photographs.

Although this research is in no way implicating the news magazines, findings indicated that the popular news magazines used a balanced number of photographs, however, the messages each photograph communicated were not balanced. It is also understood that agricultural communicators cannot control the popular press news magazines. However, a definition for a balanced image needs to be determined. Prior research indicates that compelling photographs carry more weight in the reader's mind. Should reporting balanced, photographic content mean reporting one negative and one positive photograph in every story or should it mean always using neutral photographs?

This research examined solely the photographs to determine if perceptions could be created and information communicated without written word. Many times, magazines are not read, but skimmed and the information is processed through viewing images and reading headlines.

Data indicates that the news magazine photographers have a standard format for taking the photographs and it reveals that there is an expectation for photographers capturing news magazine images. The power a photographer possess to control what is communicated by the photograph is limited if photographs must follow a set format. Readers draw their own conclusion about what the photograph means, without external factors setting the tone of the photograph before the viewer could access the meaning of the photograph.

In our effort to produce a more agriculturally-literate society, this study found that in the sample of food safety and biotechnology photographs used in this study, stereotypical photographs or photograph taken of the same types of things reinforce existing stereotypes about agricultural issues.

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APPENDIX A

NEWSWEEK



Newsweek1



Newsweek 2



Newsweek 3



Newsweek 4



Newsweek 5



Newsweek 6



Newsweek 7



Newsweek 8



Newsweek 9



Newsweek 10



Newsweek 11



Newsweek 12



Newsweek 13



Newsweek 14



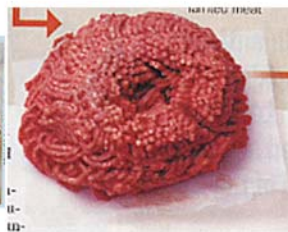
Newsweek 15



Newsweek 16

TIME

Time 1



Time 2



Time 3



Time 4



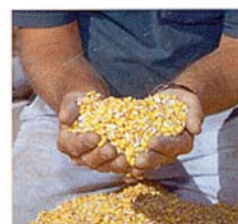
Time 5



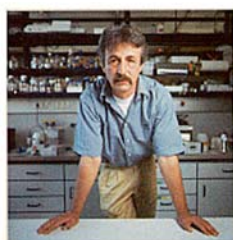
Time 6



Time 7



Time 8



Time 9



Time 10

U.S. NEWS & WORLD REPORT



U.S. 1



U.S. 2



U.S. 3



U.S. 4



U.S. 5



U.S. 6



U.S. 7



U.S. 8



U.S. 9



U.S. 10



U.S. 11



U.S. 12



U.S. 13



U.S. 14



U.S. 15



U.S. 16

U.S. NEWS & WORLD REPORT, CONT



U.S. 17



U.S. 18



U.S. 19

APPENDIX B

Instrument					
Photo Name					
Depth of Field	1 (shallow)	2	3	4	5 (deep)
Shutter Speed	1 (slow)	2	3	4	5 (fast)
Shot Angle	Below subject	Above Subject	Straight	Angled	
Light	Dark	Normal	Over-lit		
Exposure	Long (Blurred Motion)	Short (Stopped Motion)	No Motion		
Focus	Clear	Blurred			
Semiotic Signs					
Iconic					
Indexical					
Symbolic					
Staged					
Description					

Instrument Explanation	
Picture name	Indicate the name of the photograph.
Depth of Field	Rate the depth of field by choosing a number that corresponds. A shallow depth of field (1) indicates a picture that has the main subject in focus, but things in front and behind the subject may be soft. A deep depth of field will be a picture that is completely in sharp focus.
Shutter speed	You can see the shutter speed by looking for action. If action in the photograph is stopped, choose a 5. If the action is blurred, choose a 1. Numbers 2 through 4 will also indicate the amount of blurred action shown. A 3 can be chosen if there is no action shown in the photograph.
Shot Angle	The shot angle can be judged based on what position the photographer was in when he shot the subject. Choose all that apply.
Light	Choose the lighting description that best describes the photograph.
Exposure	The exposure is chosen based on the amount of blur you can see in the action. If a car is going by and it is blurry, then it is a long exposure. If the subject appears frozen, it is a short exposure.
Focus	Did the photographer capture a focused, sharp photograph or was the focus soft, blurry.
Signs	Look for these signs within an image. Understand that something could be more than one type of sign, not contain any of the signs, or contain one of each.
Iconic	Resembles the object which it represents. For example: a picture of a cat represents the furry animal that all know as a cat.
Indexical	Sign that is linked to another object in a sequential way. For example, smoke coming out of a chimney represents a fire in the fire place.
Symbolic	A symbolic sign is one which there is no resemblance between the image and the meaning. For example, a Rolls Royce symbolizes wealth.
Staged	Does this photograph appear staged, non-staged, or can it not be determine
Picture Description	Please give a brief description of the photograph. Indicate whether the feeling the photograph conveys to you is positive, negative, or neutral.

VITA

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